Cache-Conscious Coallocation of Hot Data Streams

Abstract

Techniques and tools for coallocating objects and/or object fields for the sake of cache performance are described. For example, a tool improves cache performance by

5   coallocating contemporaneously accessed heap objects. The tool analyzes object accesses to identify hot data streams in a profile run of a program. The tool directs allocations for objects in a given hot data steam to the same sequentially allocated arena, separating intervening allocations coming from other allocation sites. The tool enforces the solution by redirecting heap allocations to a run-time coallocation library. The tool

10   and analysis extend to coallocation at object field granularity. The resulting field coallocation solution generalizes common data restructuring techniques and provides insight into object restructuring by breaking down the coallocation benefit on a per-technique basis.